

(19)



(11)

EP 2 242 709 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
01.08.2012 Bulletin 2012/31

(51) Int Cl.:
B65G 17/08 (2006.01)

(21) Application number: **09704605.6**

(86) International application number:
PCT/NL2009/050021

(22) Date of filing: **19.01.2009**

(87) International publication number:
WO 2009/093897 (30.07.2009 Gazette 2009/31)

(54) **CONVEYOR PROVIDED WITH SIDE GUARD, AND SIDE GUARD ELEMENT**

FÖRDERBAND MIT SEITENSCHUTZ UND SEITENSCHUTZELEMENT

CONVOYEUR MUNI D'UNE PROTECTION LATÉRALE, ET ÉLÉMENT DE PROTECTION LATÉRALE

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

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(43) Date of publication of application:
27.10.2010 Bulletin 2010/43

(56) References cited:
EP-A- 0 019 028 EP-A- 0 113 909
EP-A- 0 175 483 WO-A-2006/127055
GB-A- 1 367 156 US-A1- 2004 011 627

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Description

5 [0001] The invention relates to a conveyor, comprising a conveying face with a side guard which is formed with a series of wall parts extending in conveying direction and upstanding substantially transversely to the conveying face, wherein in each case at least two wall parts overlap in conveying direction at least partly in a fan-like manner at a top side remote from the conveying face.

10 [0002] Such a conveyor with side guard is generally known. The side guard is used to prevent products from leaving the conveying face in transverse direction. What is achieved by providing the conveying face with a side guard is that it moves along with the conveyor. Thus, in relation to a stationarily disposed side guard, less relative movement occurs with regard to the products to be conveyed, which reduces the risk of damage to and loss of products. The upstanding wall parts are often designed as plate-shaped elements. When the conveyor is designed as a modular conveyor mat, the plate-shaped elements are typically provided with hinge loops which cooperate with the hinge pins of the conveyor mat. Such wall parts are known to the skilled person under the name "side guards". The known side guards are formed by a series of wall parts which are identical at least at their top sides, in particular by a series of identical wall parts spaced apart at regular interspaces in conveying direction, arranged at an equal distance and orientation with respect to a side edge of the conveyor.

15 [0003] US2004/0011627 discloses a stacked helical modular plastic conveyor belt system, according to the preamble of claim 1, wherein two rows of partly overlapping spacer frames are provided near the sides of the belt, the open spacer frames of the two rows having different orientations, respectively, with respect to the side of the belt.

20 [0004] Side guards on the conveying face are often used in combination with transverse partitions, also called "flights", extending between two side guards, whereby free movement of the products to be conveyed in the conveying direction can be hindered. What can be achieved with the aid of a combination of side guard and flights is that the products to be conveyed can remain lying on the conveying face when the conveyor bridges a height difference.

25 [0005] When bridging a height difference, the conveying face of the conveyor sometimes traverses an upward bend about an axis of rotation transversely to the conveying direction. This movement is indicated by the skilled person with the term "back flexing". Further, the conveying face of the conveyor sometimes traverses a downward bend about an axis of rotation at right angles to the conveying direction. This movement is indicated by the skilled person as "sprocket flexing". When the products to be conveyed are for instance moved upward by a conveyor to be poured, the conveyor often performs a back flexing movement at the transition from a flat track part to an upward inclining track part of the track guide. When pouring the products, the conveyor often performs a sprocket flexing movement in that, at the end of an upward inclining track part, the conveyor merges to a substantially flat track part of the track guide or is returned about a returning wheel.

30 [0006] When back flexing, wall parts successive in conveying direction must be able to overlap to thus enable the upward bend by sliding together. Conversely, when sprocket flexing, the successive wall parts have to overlap to a lesser extent to allow for the downward bend. However, it is desired here to maintain some overlap of the wall parts so that formation of openings which reduce the side guard function can be prevented. In particular when the side guard elements are to have a relatively great height transversely to the conveying face, it has proven difficult to combine these two requirements. Further, a large number of other requirements are imposed on the side guard, such as cleanability, reliability and safety. Therefore, the known conveyors with side guards cannot both back flex well and maintain the side guard function upon sprocket flexing. Further, they are insufficiently cleanable, are unreliable and unsafe.

35 [0007] The object of the invention is to provide a conveyor with side guard in which the drawbacks mentioned are obviated. To that end, the invention provides a conveyor, according to claim 1.

40 [0008] By forming the series with wall parts which mutually differ at least at their top sides, the back flexing and sprocket flexing properties of the side guard can be improved. By providing the slot-shaped interspace, the wall parts can overlap sufficiently to maintain their overlap well when sprocket flexing, while, upon back flexing, the wall parts can still slide together further.

45 [0009] Having the wall parts in the series differ at least at their top sides as regards orientation and/or distance with respect to a longitudinal edge of the conveyor allows for more space between successive wall parts for back flexing, or for the overlap to be maintained in conveying direction upon sprocket flexing. As an alternative or in addition thereto, wall parts in the series can mutually differ at least at their top sides in shape and/or size. Therefore, the wall parts can be of different types. In an elegant manner, the wall parts in the series successive in conveying direction mutually differ at least at their top sides.

50 [0010] The walls can be provided, at least adjacent an end, so that the walls can have at least one side face extending parallel to a side edge of the conveyor.

55 [0011] By providing each of the upstanding wall parts, viewed in conveying direction, with two ends which are connected via a substantially obliquely extending connecting piece, a geometry is achieved which is particularly advantageous both for back flexing and sprocket flexing, while further a particularly reliable and safe side guard is realized. By providing each of the upstanding wall parts with two ends that are interconnected via a substantially multi-stage designed connecting

piece, a relatively large distance can be bridged while maintaining a good guiding function transversely to the conveying direction, so that between the upstanding wall parts yet more space is present whereby back flexing can be simplified. Advantageously here, the slot-shaped interspace is configured such that one or more other wall parts from the series can be at least partly accommodated therein or even have been accommodated therein. As a result, the back flexing properties can be improved further, and even when the two successive wall parts lose their overlap when back flexing, a wall part can be present with limited intermediate distance transversely to the conveying direction, which guarantees the side guard function.

[0012] Optionally, the wall parts can each form part of a subseries of wall parts, with the subseries together forming a side guard of multiple design. What can be achieved with the aid of such a multiple design side guard is that when two wall parts from one subseries, successive in conveying direction lose their overlap when back flexing, transversely to the conveying direction, in another subseries, a wall part can be present with limited intermediate distance, which guarantees the side guard function. It is noted that a conveyor, comprising a conveying face with a side guard formed with a multiple number of subseries of wall parts extending in conveying direction and upstanding substantially transversely to the conveying direction, with in each case at least two wall parts in one series overlapping in conveying direction at least partly in a fan-like manner at a side remote from the conveying face, can also be considered an invention.

[0013] Optionally, the conveyor can comprise a number of modules successive in conveying direction, which are each provided with a body part extending transversely to the conveying direction having hinge loops reaching forward and rearward in conveying direction, while hinge loops of successive modules cooperate and are coupled with the aid of hinge pins. Such a type of conveyor is known to the skilled person and is indicated with the term modular conveyor mat. Owing to its modular design, such a modular conveyor mat is particularly suitable for including side guard elements at particular locations with which a side guard can be formed. With modular conveyor mats, one or more modules may be provided transversely to the conveying direction. Further, successive modules can mutually correspond in conveying direction or be provided in a brick pattern, staggered relative to each other. A modular conveyor mat can further be built up from mat modules of different sizes and different types such as for instance so-called end modules to be included at the edge of the conveyor mat with which the hinge pins can be confined transversely to the conveying direction, and so-called center modules which have a relatively large size transversely to the conveying direction.

[0014] With a modular conveyor mat, the pitch of successive wall parts can be chosen to be smaller than the pitch of successive modules. What can be achieved in this manner is that the extent of overlap of wall parts successive in conveying direction can be increased relatively easily. The pitch of the wall parts can also be chosen to be greater or equal to the pitch of the modules.

[0015] When, with a modular conveyor mat, the interspace in conveying direction has the largest slot-width adjacent a center of a body part, the widest slot can be as far removed as possible from the location where successive modules hinge relative to each other. Thus, upon sprocket flexing, the side guard function can be maintained better.

[0016] When the side face is located in conveying direction adjacent a center of a body part, a good connection can be realized with a flight extending transversely to the conveying direction. Preferably, the side face continues to adjacent an underside of the wall part.

[0017] By providing the conveying face, adjacent a center of a body part at least at the location of an area located under the interspace, with a recess, the side guard faces can be made easily cleanable. Preferably, the recess transversely to the conveying direction is continued as a free space surrounded by the wall parts. Such a recess can increase the manufacture of the mat module and the safety.

[0018] What can be achieved by forming the overlapping wall parts integrally with a common carrier, is that the overlapping wall parts have a highly stable positioning. This is beneficial to the reliability and the safety of the side guard. Connecting the wall parts to the carrier via a joint base provides the wall parts with a relatively robust, stable base. Here, the abovementioned recess in the module then preferably continues as a free space surrounded by the base.

[0019] By providing the common carrier with one or more hinge loops, the wall parts can be included relatively easily in a modular conveyor mat. Optionally, the common carrier can form part of a mat module. It is also possible to secure a common carrier without hinge loops, on the conveying surface of, for instance, a module. By providing at least a number of modules with at least two wall parts, a reliable and safe side guard can be realized in an elegant manner.

[0020] Further advantageous embodiments of the invention are represented in the subclaims.

[0021] It is noted that within this context, in each case, the condition of the conveyor is described in a flat plane, unless it is mentioned that the conveyor is in a back flexing or sprocket flexing position. Therefore, the overlapping of the wall parts described in claim 1 for instance, concerns a condition of the conveyor in a flat plane.

[0022] The invention will be elucidated on the basis of an exemplary embodiment which is represented in the drawings.

[0023] In the drawing:

Fig. 1A shows a schematic, perspective view of a part of a conveyor with side guard which is in flat plane;
 Fig. 1B shows a schematic top plan view of the conveyor of Fig. 1A, with a cross section along the line 1B-1B of Fig. 1A;
 Fig. 2A shows a schematic perspective view of the conveyor of Fig. 1A when traversing an upward bend;

Fig. 2B shows a schematic top plan view of the conveyor of Fig. 2A, with a cross section along the line 2B-2B of Fig. 2A;
 Fig. 3A shows a schematic, perspective view of the conveyor of Fig. 1A when traversing a downward bend;
 Fig. 3B shows a schematic top plan view of the conveyor of Fig. 3A, with a cross section along the line 3B-3B of Fig. 3A;
 Fig. 4A shows a schematic perspective view of a module of the conveyor of Fig. 1A;
 5 Fig. 4B shows a top plan view of the module of Fig. 4A;
 Fig. 4C shows a front view of the module of Fig. 4A;
 Fig. 4D shows a side view of the module of Fig. 4A; and
 Figs. 5F and 5G schematically show, in top plan view, in each case an alternative embodiment of the conveyor with
 side guard. It is noted that the Figures merely serve as schematic representations of advantageous embodiments
 10 which are represented by way of non-limitative exemplary embodiment. In the Figures, identical or corresponding
 parts are represented with the same reference numeral. Figs. 5A to 5E illustrate conveyors which are not embodi-
 ments of the invention.

[0024] Fig. 1 shows a conveyor 1, comprising a conveying face 2 with a side guard 20. The conveyor can be a modular
 15 conveyor mat, as represented here, but can also for instance be a non-modularly designed conveyor belt. In Fig. 1, it is
 shown that the conveyor 1 is in a flat plane, as is the case when traversing a flat track part of a conveying path. In Fig.
 1, only a part of the conveyor 1 is represented. The conveyor 1 is typically of endless design, while an upper part of the
 conveyor is carried, with the aid of drive wheels, along a conveying track, is returned via returning wheels and is guided
 back via a return guide. In this exemplary embodiment, the conveyor 1 is designed as a modular conveyor mat and
 20 comprises a number of modules 11 successive in conveying direction P. The modules 11 are each provided with a body
 part 12 extending transversely to the conveying direction P, with hinge loops 13A reaching forward in conveying direction
 and with hinge loops 13B reaching rearward in conveying direction. The hinge loops 13A, 13B of successive modules
 11 cooperate and are coupled with the aid of hinge pins 14 not represented in the Figure.

[0025] In the exemplary embodiment, only one side guard 20 is represented. Usually, the conveyor 1 is provided on
 25 both long side edges 8 with a side guard 20 so that the two side guards 20 are spaced apart at a considerable intermediate
 distance and the largest part of the conveying face is situated between the side guards 20. As already explained in the
 introduction to the specification, transversely to the conveying direction P, optionally, flights may be provided (not rep-
 resented in the Figure).

[0026] In Fig. 1, only one row of modules 11 is represented. It will be clear that a modular conveyor mat can be built
 30 up from several modules 11 transversely to the conveyor direction, for instance a series of modules without wall parts
 3 which, transversely to the conveying direction P, is enclosed on the side edges 8 of the mat by edge modules with
 one or more wall parts 3A, 3B. The side guard 20 is formed having a series 10 of wall parts 3 upstanding substantially
 transversely to the conveying face and extending in conveying direction, indicated with double arrow P. In the series 10,
 35 as indicated for instance at arrows P1 and P2, in each case, two wall parts 3 overlap in conveying direction P at least
 partly in a fan-like manner at a top side 4 remote from the conveying face 2. Wall parts 3 in the series 10 mutually differ
 at least at their top sides 4. Wall parts 3 in the series 10 successive in conveying direction P mutually differ at their tops
 4 in their distance with respect to a longitudinal edge 8 of the conveyor 1. These overlapping wall parts 3 are provided
 while including a slot-shaped interspace 5 with a thickness which corresponds to at least one top side 4 of a wall part 3.

[0027] In this exemplary embodiment, the wall parts 3 overlapping with a slot-shaped interspace 5 are not successive
 40 in conveying direction P but in each case separated by a further wall part. Optionally, as will be elucidated further on
 the basis of Fig. 5, the, in each case, two wall parts 3 overlapping at the top side 4 at least partly in a fan-like manner,
 and including a slot-shaped interspace 5, can also be successive in conveying direction P. The slot width of the interspace
 5 corresponds to the thickness of at least a top side 4 of the wall part 3. Adjacent at least one end 6, the overlapping
 wall parts 3 proceed with at least one side face 7 substantially parallel to a side edge 8 of the conveyor 1.

[0028] Viewed in conveying direction P, the overlapping wall parts are each provided with two ends 6 which are
 45 connected via a substantially obliquely extending connecting piece 9. In the flat position shown in Fig. 1, one other wall
 part 3A' from the series 10 is at least partly accommodated in the slot-shaped interspace 5. Here, the overlapping wall
 parts 3A, 3B are arranged at different distances relative to the side edge 8 of the conveyor 1. The wall parts 3A, 3B each
 form part of a subseries 10A, 10B of wall parts 3, while the subseries 10A, 10B form a side guard 20 of multiple design.

[0029] In this exemplary embodiment, in conveying direction P, the pitch of successive wall parts 3 is smaller than the
 50 pitch of successive modules 11. Here, adjacent the center 15 of the body part 12, in the conveying direction P, the
 interspace 5 has the largest slot width, and the side face 7 is located, in conveying direction P, adjacent the center 15
 of the body part 12. Here, the conveying face 2 is provided, adjacent the center of the middle part 12, at least at the
 location of an area located under the interspace 5, with a recess 16. In this example, the recess continues transversely
 55 to the conveying face 2 as a free space surrounded by the wall parts 3A, 3B. The overlapping wall parts 3A, 3B are
 integrally formed with a common carrier, which, in this exemplary embodiment, is formed by the body part of a module
 11. The wall parts 3A, 3B are connected to the carrier via a common base and the common carrier is provided with hinge
 loops 13. In the Figures, all modules 11 are provided with two wall parts 3A, 3B.

[0030] Referring to Fig. 4, in detail, a module 11 is shown from the conveyor 1 of Fig. 1. The module 11 shown is provided with at least two wall parts 3A, 3B. The module forms a side guard element for a conveyor mat 1, comprising a common carrier, in this case the body part 12 of the module 11', with a conveying face 2. The conveying face 2 is provided with two upstanding wall parts 3A, 3B, which overlap at least partly in a fan-like manner at a top side 4 remote from the conveying face 2, while including a slot-shaped interspace 5 which corresponds to the thickness of at least a top side 4 of the wall part 3. In this exemplary embodiment, the wall parts 3 proceed, at least adjacent an end 6, with at least one side face 7 substantially parallel to a side edge 8' of the module 11.

[0031] With reference to Fig. 2, it is represented that the conveying face 2 of the conveyor 1 traverses an upward bend about an axis of rotation A1 transversely to the conveying direction P. Here, the conveyor 1 performs a back flexing movement. As is represented in Fig. 2, the successive wall parts 3A, 3A', 3A", and 3B, 3B', 3B", respectively, in the subseries 10A, 10B overlap more than in Fig. 1, so that the upward bend is enabled through sliding together of the wall parts. As the side faces 7, running substantially parallel to the side edge 8 of the conveyor 1, have a relatively large slot-shaped interspace 5 adjacent the ends 6 of the overlapping wall parts 3A, 3B, a wall part 3A' successive in conveying direction P can be accommodated.

[0032] In Fig. 3 it is shown that the conveying face 2 of the conveyor 1 traverses a downward bend about an axis of rotation A2 transversely to the conveying direction P. Here, the conveyor 1 performs a sprocket flexing movement. The wall parts 3A, 3A' successive in conveying direction overlap to a lesser extent than in the situation shown in Fig. 1. However, transversely to the conveying direction P, with a small intermediate distance, a wall part 3B is present which guarantees the side guard function.

[0033] In this exemplary embodiment, the wall parts 3 are each provided on both ends with one side face 7 which runs substantially parallel to the side edge 8 of the conveyor 1. This needs not always be the case. In another embodiment for instance, one or both ends 6 can be provided with two side faces 7 running parallel to the side edge, or even with faces not running parallel.

[0034] It is noted that the invention is not limited to the exemplary embodiment represented in Figs. 1 - 4. Many variants are possible. For instance, wall parts in the series can mutually differ at least at their top sides in orientation and/or distance with respect to a longitudinal edge of the conveyor. Also, wall parts in the series can mutually differ at least at their top side in shape and/or size. In Fig. 5A for instance, a variant embodiment is represented where the side guard 20 is built up with the aid of two types of modules 11 which alternate in conveying direction P. Both types are provided with two wall parts 3 overlapping in conveying direction at least partly in a fan-like manner while including a slot-shaped interspace 5. Here, the wall parts 3 extend in their entirety substantially parallel to a side edge 8 of the conveyor 1, and are arranged each at a different distance with respect to the side edge 8 of the conveyor 1, while their orientation is the same. In this embodiment, the side guard 20 is built up with a number of parallel proceeding series of wall parts 3, while per row, in conveying direction, the wall parts 3 have an interspace which is greater than a wall part 3. In Fig. 5B, a variant is shown where one of the types of modules bears only one wall part 3. In Fig. 5C, a different variant is shown, where the wall parts 3 are connected via a part that is of stepped design. In Fig. 5D, schematically, the variant embodiment of Figs. 1 - 4 is represented. With this variant one type of module 11 is provided, which is provided two obliquely arranged wall parts 3A. Here, the wall parts 3 are placed at different distances to the side edge 8. In Fig. 5E, an embodiment is shown where two types of modules 11 are provided, each bearing one wall part 3. The wall parts 3 of the different types are arranged at different distances to the side edge. In this embodiment, the wall parts are each provided with two ends 6 which are interconnected via a substantially obliquely extending connecting piece 9. At the ends 6, the wall parts 3 are each provided with a side face 7 running substantially along the longitudinal edge. In this embodiment, the side faces 7 are located in four parallel rows in conveying direction P. In Fig. 5F, an exemplary embodiment is shown where one type of module 11 is provided, while in each case, one wall part 3 is included in the same position and orientation with respect to the side edge 8. The wall part 3 is provided adjacent both ends 6 with a side face 7 which proceeds substantially parallel to a side edge of the conveyor. Wall parts successive in conveying direction overlap at least partly in a fan-like manner at a top side 4 remote from the conveying face 2 and include a slot-shaped interspace 5 which corresponds to the thickness of at least one top side of a wall part. In this embodiment, the slot-shaped interspace 5 is a few times the thickness of the top side 4 of a wall part 3. In the exemplary embodiment of Fig. 5F, the two ends are interconnected via a substantially obliquely extending connecting piece 9. In the embodiment of Fig. 5G, the ends are interconnected via a connecting piece of substantially stepped design. With the embodiments in Fig. 5E, 5F and 5G, the pitch of the wall parts is equal to the pitch of the modules, and the largest slot width is located near a hinge loop of the module. It will be clear that the exemplary embodiments represented in Fig. 5 can also be applied with a non-modular conveyor.

[0035] These and other variants will be clear to the skilled person and are understood to fall within the scope of the invention as set forth in the following claims.

[0036] In an example for a side guard element for a conveyor mat, the side guard element comprises a common carrier with a conveying face provided with at least two upstanding wall parts which overlap at least partly in a fan-like manner at a top side remote from the conveying surface thereby including a slot-shaped interspace which corresponds to the thickness of at least a top side of a wall part. In such a side guard element the wall parts can have a common base.

[0037] Furthermore, the common carrier for said sideguard for a conveyor mat can be provided with one or more hinge loops and still furthermore said common carrier can form part of a module for a modular conveyor mat, comprising a body part provided at front and rear sides extending transversely to the conveying direction with rows of hinge loops spaced apart at mutual interspaces transversely to the conveyor direction with hinge holes extending transversely to the conveying direction so that front sides and rear sides of successive modules are couplable through engagement of the hinge loops with the aid of a hinge pin extending transversely to the conveying direction, so that top faces of the coupled modules form a conveying face.

[0038] In such a side guard element, in conveying direction said interspace can have the largest slot-width adjacent a center of the body part. Also, in conveying direction said side surface can be located adjacent a center of the body part. In such a side guard element the conveying face can be provided in conveying direction adjacent a center of a body part at least at the location of an area located under the interspace, with a recess, which recess preferably continues as a free space surrounded by the wall parts and/or a common base.

[0039] In a side guard element according to the example said overlapping wall parts can be arranged with different orientation and/or position with respect to a side edge of the module.

[0040] As such, a conveyor can comprise a conveying face with a side guard which is formed with a series of wall parts extending in a conveying direction and upstanding substantially transversely to the conveying face, wherein repeatedly at least two wall parts overlap in conveying direction at least partly in a fan-like manner at a top side remote from the conveying face, are arranged to include an intermediate distance which corresponds to the thickness of at least one top side of a wall part, and proceed, at least adjacent an end, with at least one side face substantially parallel to a side edge of the conveyor.

[0041] What is achieved by having wall parts proceed at least adjacent an end with at least one side face substantially parallel to a side edge of the conveyor, is that the wall parts can overlap when back flexing to a sufficient extent to well maintain their overlap when sprocket flexing, while, upon back flexing, the wall parts can still sufficiently slide in further.

- 1. conveyor
- 2. conveying face
- 3A, 3B; 3A', 3B'; 3A"; 3B" wall parts
- 4 top side wall parts
- 5. slot-shaped interspace
- 6. end wall part
- 7. side face
- 8. side edge mat
- 8'. side edge module
- 9. oblique connecting piece between ends
- 10A, 10B series of wall parts
- 11 modules
- 12 body part
- 13A, 13B hinge loops
- 14 hinge pin
- 15 center body part
- 16 recess
- 17 common base
- 20 side guard
- double arrow P conveying direction
- P1 exemplary location two overlapping wall parts
- P2 further exemplary location two overlapping wall parts
- A1 axis of rotation Fig. 2
- A2 axis of rotation Fig. 3

Claims

1. A conveyor (1), comprising a conveying face (2) with a side guard (20) which is formed with a series (10) of wall parts (3) extending in a conveying direction (P) and upstanding substantially transversely to the conveying face (2), wherein repeatedly at least two wall parts (3) overlap in conveying direction (P) at least partly in a fan-like manner at a top side (4) remote from the conveying face (2), and wherein wall parts (3) in the series (10) mutually differ at least at their top sides (4), **characterised in that** said at least two overlapping wall parts (3) are arranged to include a slot-shaped interspace (5) which corresponds to a thickness of at least a top side (4) of a wall part (3).

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2. A conveyor according to claim 1, wherein wall parts (3) in the series (10) mutually differ at least at their top sides (4) in orientation and/or distance with respect to a longitudinal edge (8) of the conveyor (1).
- 5 3. A conveyor according to claim 1 or 2, wherein wall parts (3) in the series (10) mutually differ at least at their top sides (4) in form and/or size.
4. A conveyor according to any one of the preceding claims, wherein wall parts (3) in the series (10) successive in conveying direction (P) mutually differ at their top sides (4).
- 10 5. A conveyor according to claim 1, wherein, adjacent an end (6), the overlapping wall parts (3) have at least one side face (7) extending substantially parallel to a side edge (8) of the conveyor (1).
6. A conveyor according to anyone of the preceding claims, wherein said overlapping wall parts (3), viewed in conveying direction (P), are each provided with two ends (6) which are connected via a substantially obliquely extending connecting piece (9).
- 15 7. A conveyor according to anyone of the preceding claims, wherein, viewed in conveying direction (P), said upstanding walls (3) are each provided with two ends (6) which are connected via a connecting piece (9) of substantially stepped design.
- 20 8. A conveyor according to any one of the preceding claims, wherein one or more other wall parts (3) from the series (10) can at least partly be accommodated in the slot-shaped interspace (5).
9. A conveyor according to any one of the preceding claims, wherein one or more other wall parts (3) from the series (10) are accommodated at least partly in the slot-shaped interspaces (5).
- 25 10. A conveyor according to any one of the preceding claims, wherein said overlapping wall parts (3) are arranged with different orientation and/or distance with respect to a side edge (8) of the conveyor (1).
- 30 11. A conveyor according to any one of the preceding claims, wherein the series (10) is formed with different types of wall parts (3).
12. A conveyor according to any one of the preceding claims, wherein said wall parts (3) each form part of a subseries (10A, 10B) of wall parts (3), wherein the subseries jointly form a side guard (20) of multiple design.
- 35 13. A conveyor according to any one of the preceding claims, comprising a number of modules (11) successive in conveying direction (P), each provided with a body part (11) extending transversely to the conveying direction (P) having hinge loops (13A, 13B) reaching forward and rearward in conveying direction (P), wherein the hinge loops (13A, 13B) of successive modules (11) cooperate and are coupled with the aid of hinge pins (14).
- 40 14. A conveyor according to claim 13, wherein in conveying direction (P) the pitch of successive wall parts (3) is smaller than the pitch of successive modules (11).
15. A conveyor according to claim 13 or 14, wherein, in conveying direction (P), said interspace (5) has the largest slot-width adjacent a center (15) of a body part (12).
- 45 16. A conveyor according to any one of claims 13 - 15, wherein, in conveying direction (P), said side face (7) is located adjacent a center (15) of a body part (12).
- 50 17. A conveyor according to any one of claims 13 - 16, wherein the conveying face (2) is provided adjacent a center (15) of a body part (12) at least at the location of an area located under the interspace (5), with a recess (16), which recess (16) preferably continues as a free space surrounded by the wall parts (3) and/or a common base.
18. A conveyor according to any one of the preceding claims, wherein said overlapping wall parts (3) are integrally formed with a common carrier.
- 55 19. A conveyor according to claim 18, wherein the wall parts (3) are connected to the carrier via a common base (17).

20. A conveyor according to claim 13 and claims 18 or 19, wherein the common carrier is provided with one or more hinge loops (13A, 13B).

5 21. A conveyor according to claim 13 and any one of claims 18 - 20, wherein the common carrier forms part of a module (11).

22. A conveyor according to any one of claims 13 - 21, wherein at least a number of modules (11) are provided with at least two wall parts (3).

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Patentansprüche

15 1. Förderer (1), umfassend eine Förderfläche (2) mit einem Seitenschutz (20), gebildet mit einer Reihe (10) von Wandteilen (3), die sich in Förderrichtung (P) erstrecken und im Wesentlichen schräg zur Förderfläche (2) aufrecht stehen, wobei sich wiederholt mindestens zwei Wandteile (3) in Förderrichtung (P) mindestens teilweise fächerartig an einer von der Förderfläche (2) entfernten Oberseite (4) überlappen, und wobei die Wandteile (3) in der Reihe (10) sich mindestens an ihren Oberseiten (4) voneinander unterscheiden, **dadurch gekennzeichnet, dass** die mindestens zwei überlappenden Wandteile (3) angeordnet sind, um einen schlitzförmigen Zwischenraum (5) einzuschließen, der einer Dicke von mindestens einer Oberseite (4) eines Wandteils (3) entspricht.

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2. Förderer nach Anspruch 1, wobei Wandteile (3) in der Reihe (10) sich mindestens an ihren Oberseiten (4) in Ausrichtung und/oder Abstand in Bezug auf eine Längskante (8) des Förderers voneinander unterscheiden.

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3. Förderer nach Anspruch 1 oder 2, wobei Wandteile (3) in der Reihe (10) sich mindestens an ihren Oberseiten (4) in Form und/oder Größe voneinander unterscheiden.

4. Förderer nach einem der vorhergehenden Ansprüche, wobei Wandteile (3) in der Reihe (10), in Förderrichtung (P) aufeinander folgend, sich von einander an ihren Oberseiten (4) unterscheiden.

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5. Förderer nach Anspruch 1, wobei, angrenzend an ein Ende (6), die überlappenden Wandteile (3) mindestens eine Seitenfläche (7) haben, die im Wesentlichen parallel zu einer Seitenkante (8) des Förderers (1) verläuft.

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6. Förderer nach einem der vorhergehenden Ansprüche, wobei die überlappenden Wandteile (3), gesehen in Förderrichtung (P), jeweils mit zwei Enden (6) versehen sind, die über ein im Wesentlichen schräg verlaufendes Verbindungsstück (9) verbunden sind.

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7. Förderer nach einem der vorhergehenden Ansprüche, wobei, gesehen in Förderrichtung (P), die aufrechten Wände (3) jeweils mit zwei Enden (6) versehen sind, die über ein Verbindungsstück (9) von im Wesentlichen stufenförmigem Design verbunden sind.

8. Förderer nach einem der vorhergehenden Ansprüche, wobei eines oder mehrere der Wandteile (3) der Reihe (10) mindestens teilweise in dem schlitzförmigen Zwischenraum (5) aufgenommen werden können.

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9. Förderer nach einem der vorhergehenden Ansprüche, wobei eines oder mehrere andere Wandteile (3) der Serie (10) mindestens teilweise in den schlitzförmigen Zwischenräumen (5) aufgenommen sind.

10. Förderer nach einem der vorhergehenden Ansprüche, wobei die überlappenden Wandteile (3) mit unterschiedlicher Orientierung und/oder unterschiedlichem Abstand in Bezug auf eine Seitenkante (8) des Förderers (1) angeordnet sind.

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11. Förderer nach einem der vorhergehenden Ansprüche, wobei die Reihe (10) mit verschiedenen Typen von Wandteilen (3) gebildet ist.

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12. Förderer nach einem der vorhergehenden Ansprüche, wobei die Wandteile (3) jeweils einen Teil einer Teilreihe (10A, 10B) von Wandteilen (3) bilden, wobei die Teilreihen zusammen einen Seitenschutz (20) vielfältiger Art bilden.

13. Förderer nach einem der vorhergehenden Ansprüche, umfassend eine Anzahl von Modulen (11), aufeinander folgend in Förderrichtung (P), jeweils versehen mit einem Körperteil (11), das quer zur Förderrichtung (P) verläuft, mit

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Scharnierschlingen (13A, 13B), die vorwärts und rückwärts in Förderrichtung (P) reichen, wobei die Scharnierschlingen (13A, 13B) von aufeinander folgenden Modulen (11) zusammenwirken und mithilfe von Scharnierstiften (14) gekoppelt sind.

- 5 14. Förderer nach Anspruch 13, wobei in Förderrichtung (P) der Abstand aufeinander folgender Wandteile (3) kleiner ist als der Abstand aufeinander folgender Module (11).
- 10 15. Förderer nach Anspruch 13 oder 14, wobei in Förderrichtung (P) der Zwischenraum (5) die größte Schlitzbreite angrenzend an ein Zentrum (5) eines Körperteils (12) hat.
- 15 16. Förderer nach einem der Ansprüche 13-15, wobei in Förderrichtung (P) die Seitenfläche (7) sich angrenzend an ein Zentrum (15) eines Körperteils (12) befindet.
17. Förderer nach einem der Ansprüche 13-16, wobei die Förderfläche (2) angrenzend an ein Zentrum (15) eines Körperteils (12) und mindestens an der Stelle eines Bereichs unter dem Zwischenraum (5) bereitgestellt ist, mit einer Aussparung (16), die sich vorzugsweise als freier Raum, umgeben von den Wandteilen (3) und/oder einer gemeinsamen Basis fortsetzt.
- 20 18. Förderer nach einem der vorhergehenden Ansprüche, wobei die überlappenden Wandteile (3) integral mit einem gemeinsamen Träger gebildet sind.
19. Förderer nach Anspruch 18, wobei die Wandteile (3) über eine gemeinsame Basis (17) mit dem Träger verbunden sind.
- 25 20. Förderer nach Anspruch 13 und Ansprüchen 18 oder 19, wobei der gemeinsame Träger mit einer oder mehreren Scharnierschlingen (13A, 13B) versehen ist.
- 30 21. Förderer nach Anspruch 13 und einem der Ansprüche 18-20, wobei der gemeinsame Träger einen Teil eines Modus (11) bildet.
22. Förderer nach einem der Ansprüche 13-21, wobei mindestens eine Anzahl von Modulen (11) mit mindestens zwei Wandteilen (3) versehen sind.

35 Revendications

- 40 1. Convoyeur (1), comportant une surface de transport (2) pourvue d'une protection latérale (20) laquelle est constituée d'une série (10) de parties de paroi (3) s'étendant dans la direction du transport (P) et s'élevant de façon essentiellement transversale à la surface de transport (2), dans lequel de façon répétée au moins deux parties de paroi (3) se chevauchent dans la direction du transport (P), au moins partiellement, à la manière d'un éventail au niveau d'un bord supérieur (4) à distance de la surface de transport (2), et dans lequel les parties de paroi (3) de la série (10) se différencient mutuellement, au moins au niveau de leurs bords supérieurs (4), **caractérisé en ce que** lesdites au moins deux parties de paroi qui se chevauchent (3) sont agencées de façon à inclure un espacement configuré en forme de fente (5) qui correspond à une épaisseur d'au moins un bord supérieur (4) d'une partie de paroi (3).
- 45 2. Convoyeur selon la revendication 1, dans lequel les parties de paroi (3) de la série (10) se différencient mutuellement, au moins au niveau de leurs bords supérieurs (4), par leur orientation et / ou leur distance par rapport à une bordure longitudinale (8) du convoyeur (1).
- 50 3. Convoyeur selon la revendication 1 ou 2, dans lequel les parties de paroi (3) de la série (10) se différencient mutuellement au moins au niveau de leurs bords supérieurs (4) par leur forme et/ou leur dimension.
- 55 4. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel les parties de paroi (3) de la série (10) qui se suivent dans la direction de transport (P) se différencient mutuellement au niveau de leurs bords supérieurs (4).
5. Convoyeur selon la revendication 1, dans lequel de façon adjacente à une extrémité (6), les parties de paroi qui se chevauchent (3) présentent au moins une face latérale (7) s'étendant de façon essentiellement parallèle à un bord

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latéral (8) du convoyeur (1).

- 5 6. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel lesdites parties de paroi (3) qui se chevauchent, observées dans la direction de transport (P), sont dotées, chacune, de deux extrémités (6) qui sont raccordées par l'intermédiaire d'une pièce de raccordement s'étendant de façon essentiellement oblique (9).
- 10 7. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel, observées dans la direction de transport (P), lesdites parois verticales (3) sont, chacune, munies de deux extrémités (6) qui sont raccordées par l'intermédiaire d'une pièce de raccordement (9) présentant essentiellement une configuration à gradins.
- 15 8. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel une ou plusieurs autre(s) partie(s) de paroi (3) de la série (10) peut (peuvent) au moins partiellement être reçue(s) dans les espacements configurés en forme de fente (5).
- 20 9. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel une ou plusieurs autre(s) partie(s) de paroi (3) de la série (10) est (sont) reçue(s), au moins, partiellement, dans les espacements configurés en forme de fente (5).
- 25 10. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel lesdites parties de paroi qui se chevauchent (3) sont agencées avec une orientation et/ou une distance différente par rapport au bord latéral (8) du convoyeur (1).
- 30 11. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel la série (10) est formée de différents types de parties de paroi (3).
- 35 12. Convoyeur selon l'une quelconque des revendications précédentes, dans lequel lesdites parties de paroi (3) font, chacune, partie d'une sous-série (10A, 10B) de parties de paroi (3), dans lequel les sous-séries constituent lorsque juxtaposées une protection latérale (20) de configurations multiples.
- 40 13. Convoyeur selon l'une quelconque des revendications précédentes, comportant un certain nombre de modules (11) se succédant dans la direction de transport (P), chacun étant doté d'une partie de corps (11) s'étendant transversalement à la direction de transport (P) comportant des boucles d'articulation (13A, 13B) se développant vers l'avant et vers l'arrière dans la direction de transport (P), dans lequel les boucles d'articulation (13A, 13B) de modules successifs (11) coopèrent et sont couplées à l'aide de broches d'articulation (14).
- 45 14. Convoyeur selon la revendication 13, dans lequel, dans la direction de transport (P), le pas des parties de paroi successives (3) est plus petit que le pas des modules successifs (11).
- 50 15. Convoyeur selon la revendication 13 ou 14, dans lequel, dans la direction de transport (P), ledit espacement (5) présente la largeur de fente la plus grande de façon adjacente au centre (15) d'une partie de corps (12).
- 55 16. Convoyeur selon l'une quelconque des revendications 13 à 15, dans lequel, dans la direction de transport (P), ladite face latérale (7) est placée de façon adjacente au centre (15) d'une partie de corps (12).
17. Convoyeur selon l'une quelconque des revendications 13 à 16, dans lequel la surface de transport (2) est dotée, de façon adjacente au centre (15) d'une partie de corps (12) au moins au niveau de la position d'une zone située sous l'espacement (5), d'un évidement (16), lequel évidement (16) se prolonge, de préférence, sous la forme d'un espace libre entouré par les parties de paroi (3) et/ou une base commune.
18. Convoyeur selon l'une quelconque des revendications précédentes dans lequel lesdites parties de paroi qui se chevauchent (3) sont formées solidairement avec un support commun.
19. Convoyeur selon la revendication 18, dans lequel les parties de paroi (3) sont raccordées au support par l'intermédiaire d'une base commune (17).
20. Convoyeur selon la revendication 13 et les revendications 18 ou 19, dans lequel le support commun est doté d'une ou de plusieurs boucle(s) d'articulation (13A, 13B).

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21. Convoyeur selon la revendication 13 et l'une quelconque des revendications 18 à 20, dans lequel le support commun fait partie d'un module (11).
22. Convoyeur selon l'une quelconque des revendications 18 à 21, dans lequel au moins un certain nombre de modules (11) est prévu avec au moins deux parties de paroi (3).

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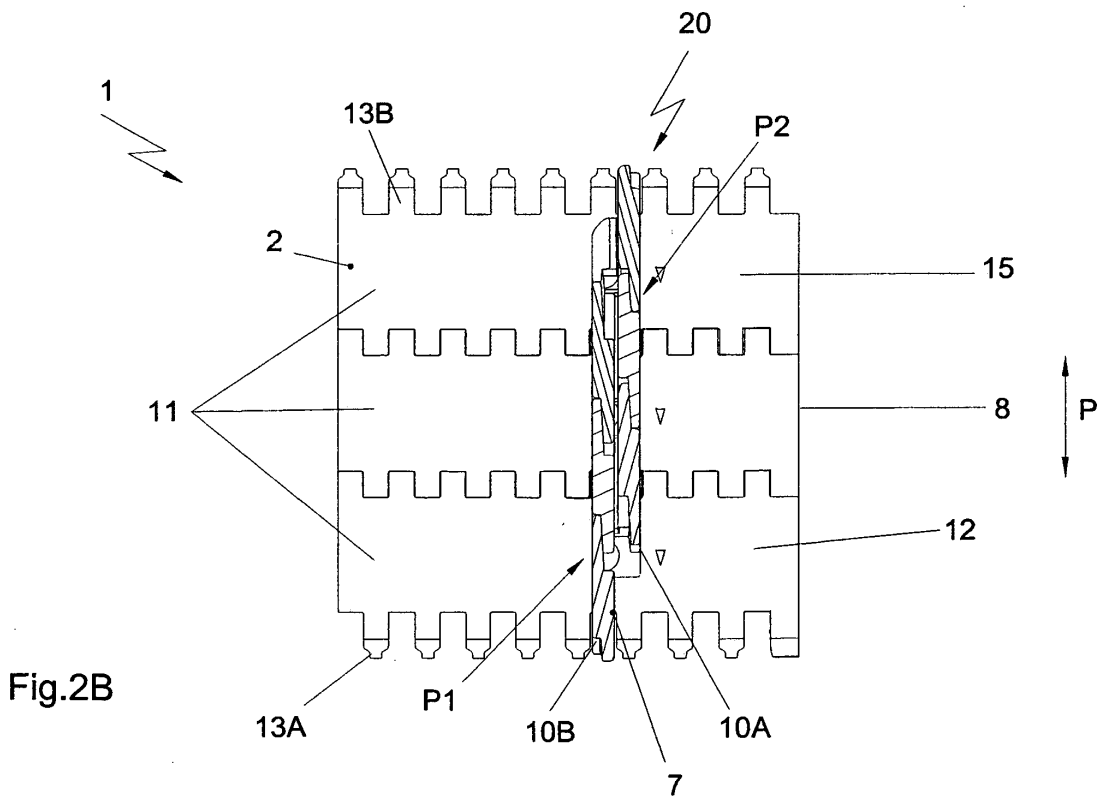
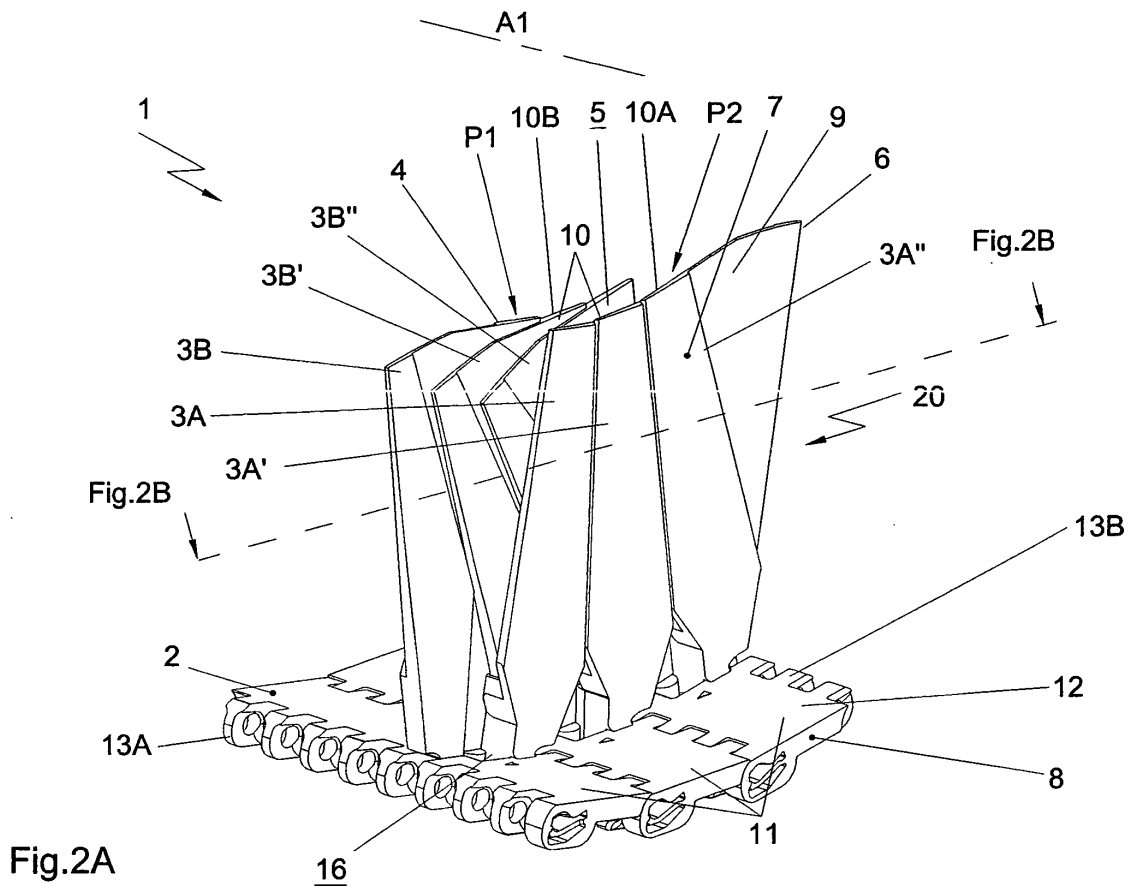
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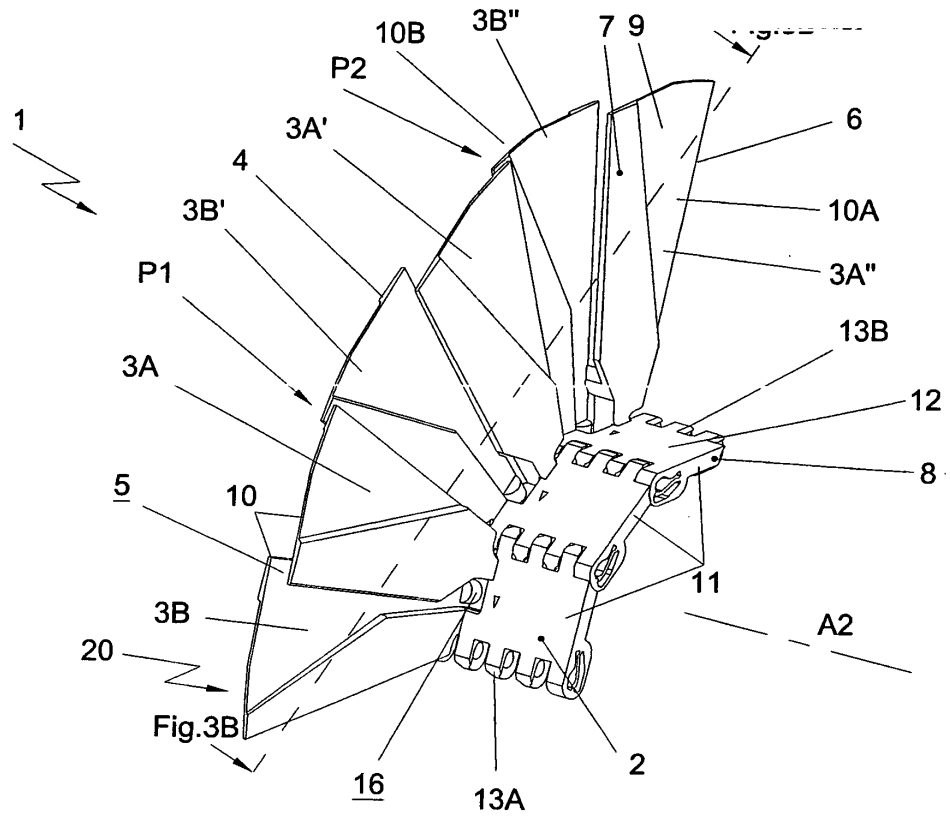


Fig.3A

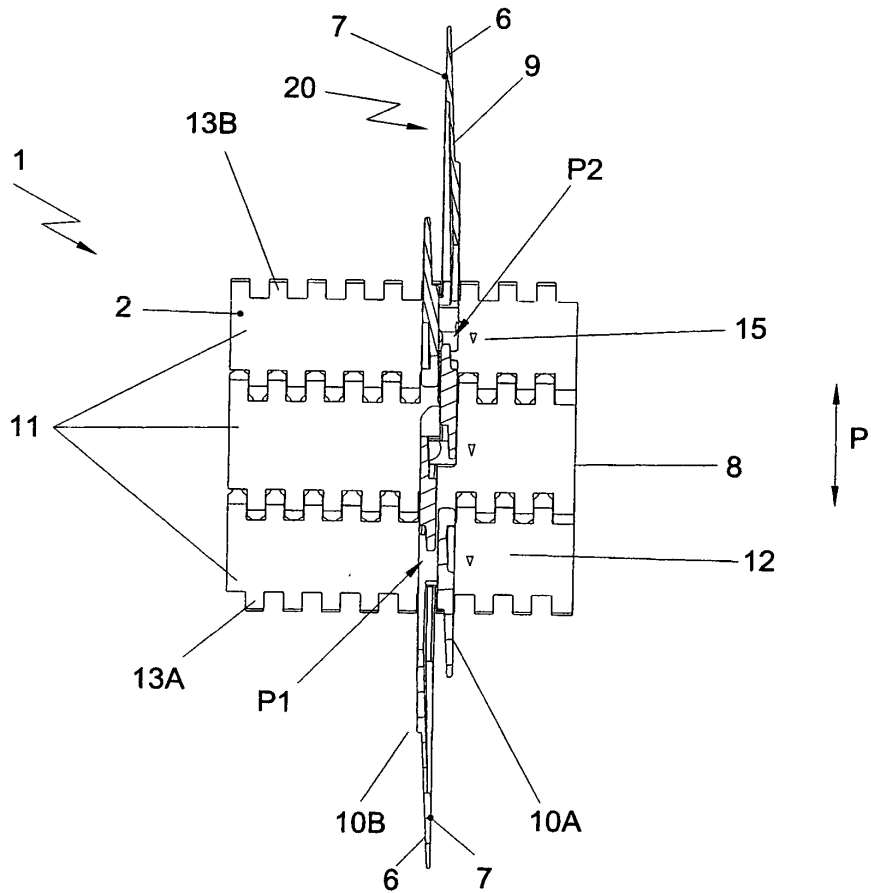


Fig.3B

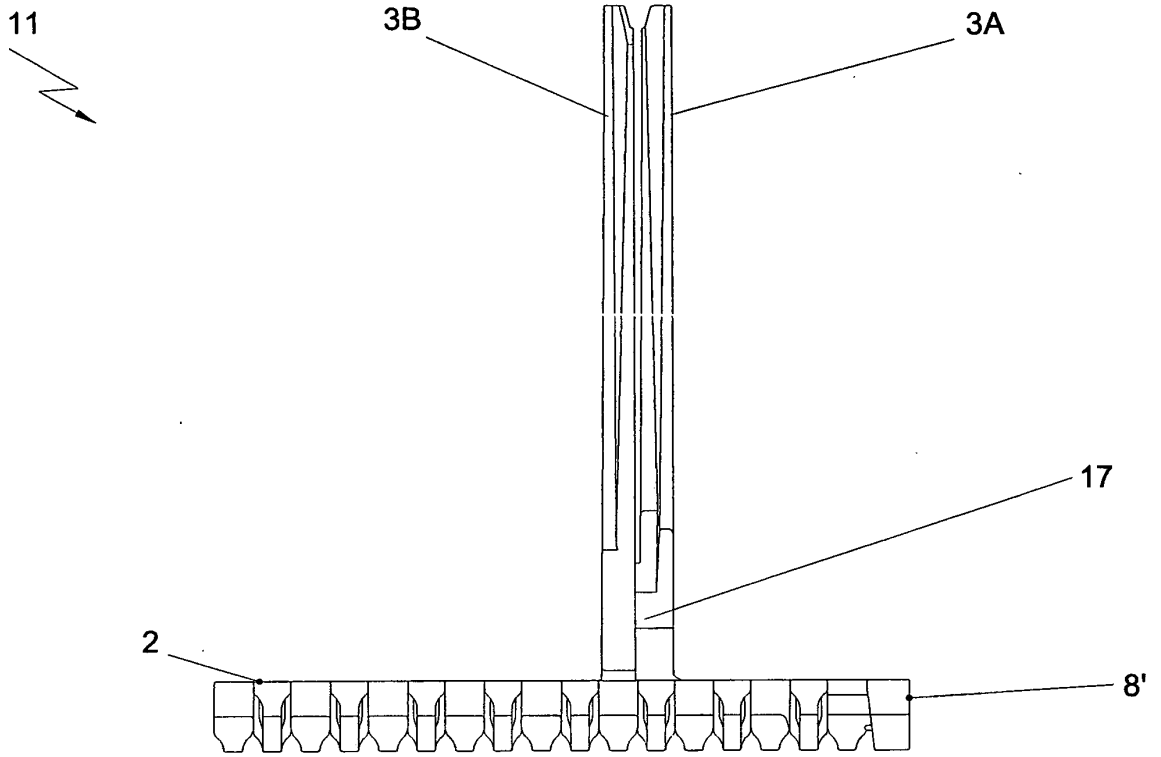


Fig. 4C

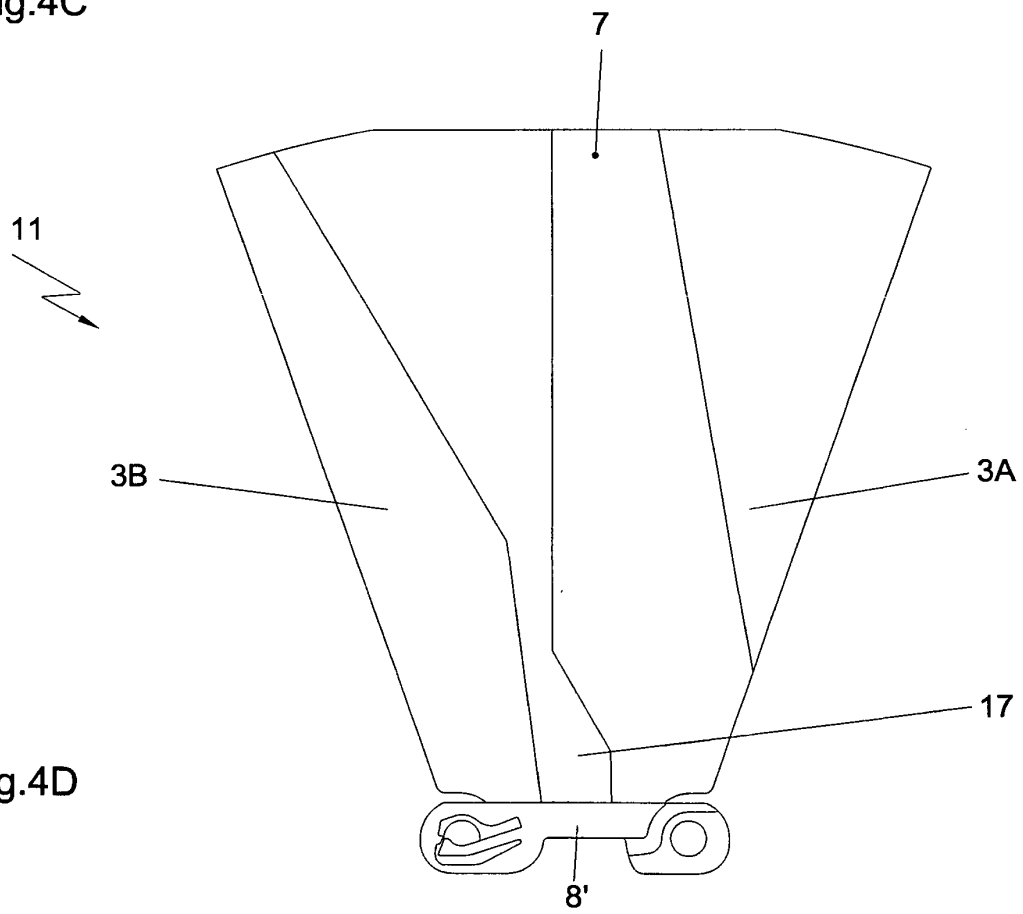


Fig. 4D

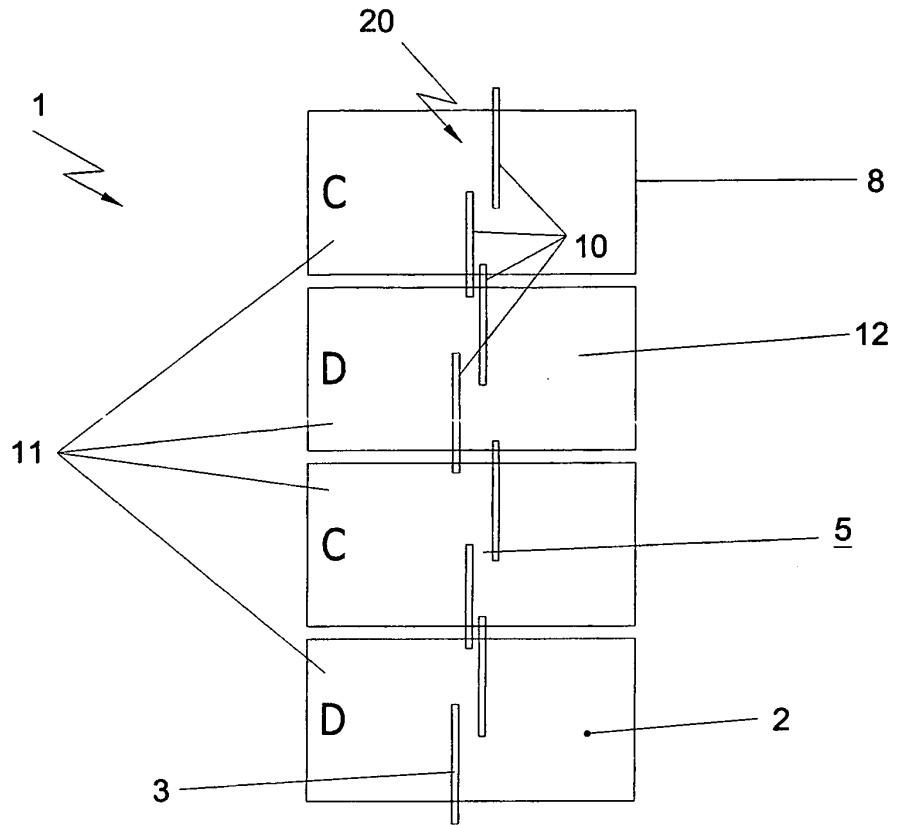


Fig.5A

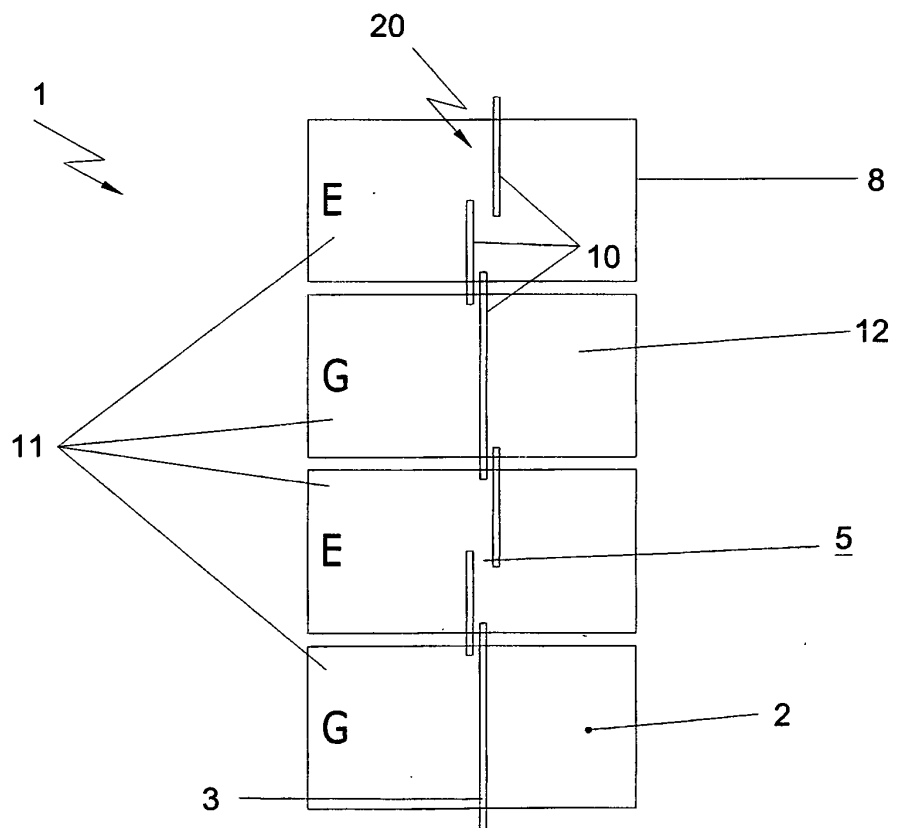


Fig.5B

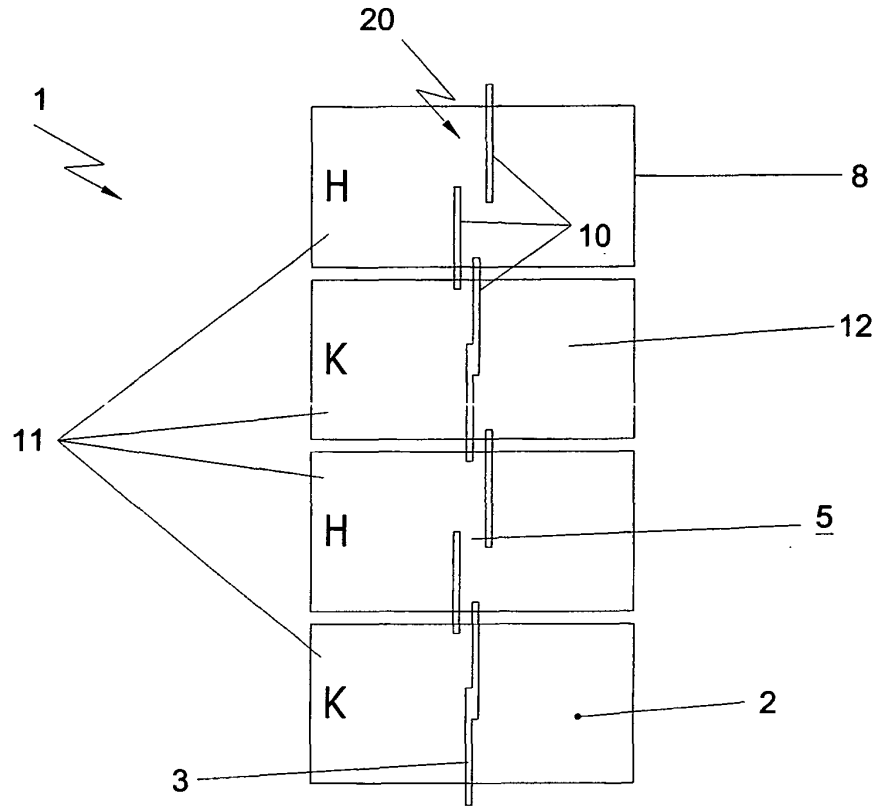


Fig.5C

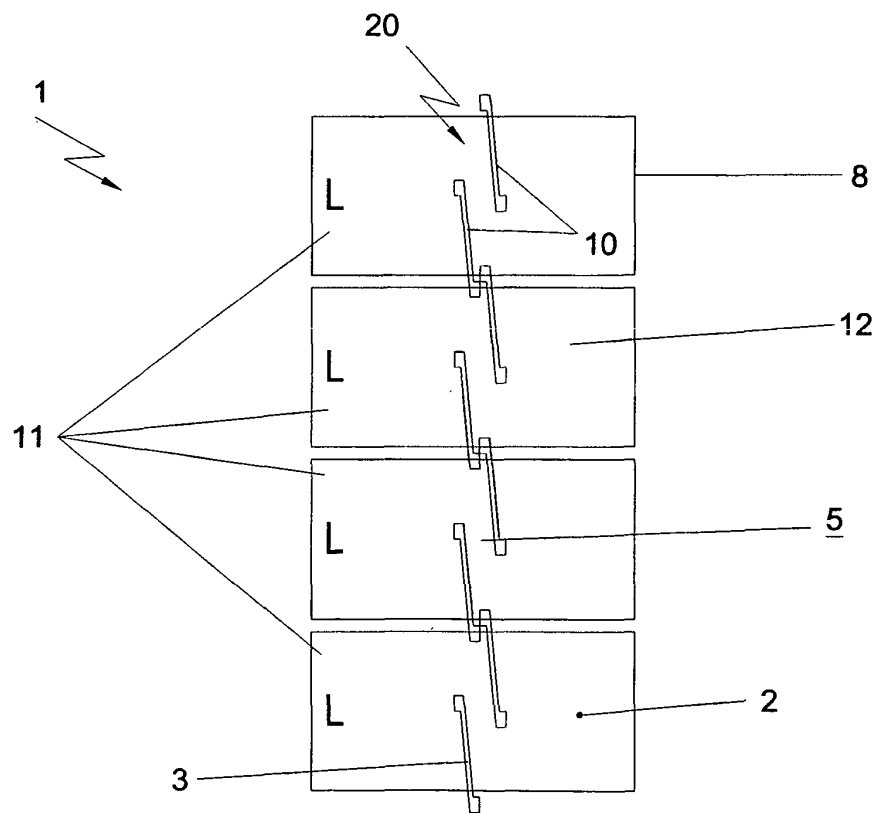


Fig.5D

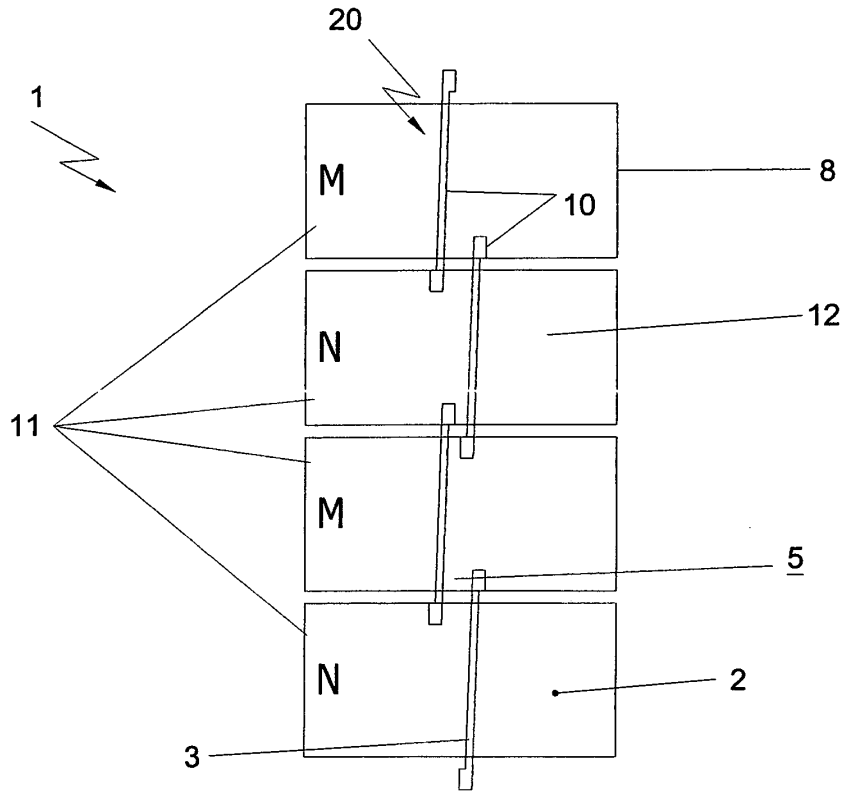


Fig.5E

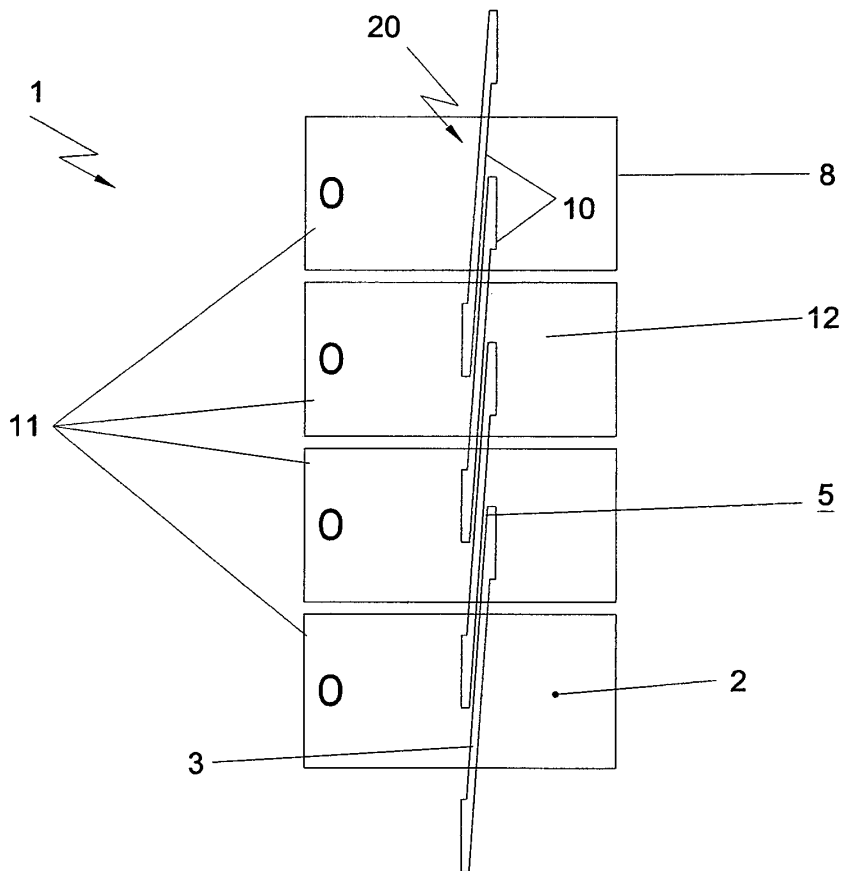


Fig.5F

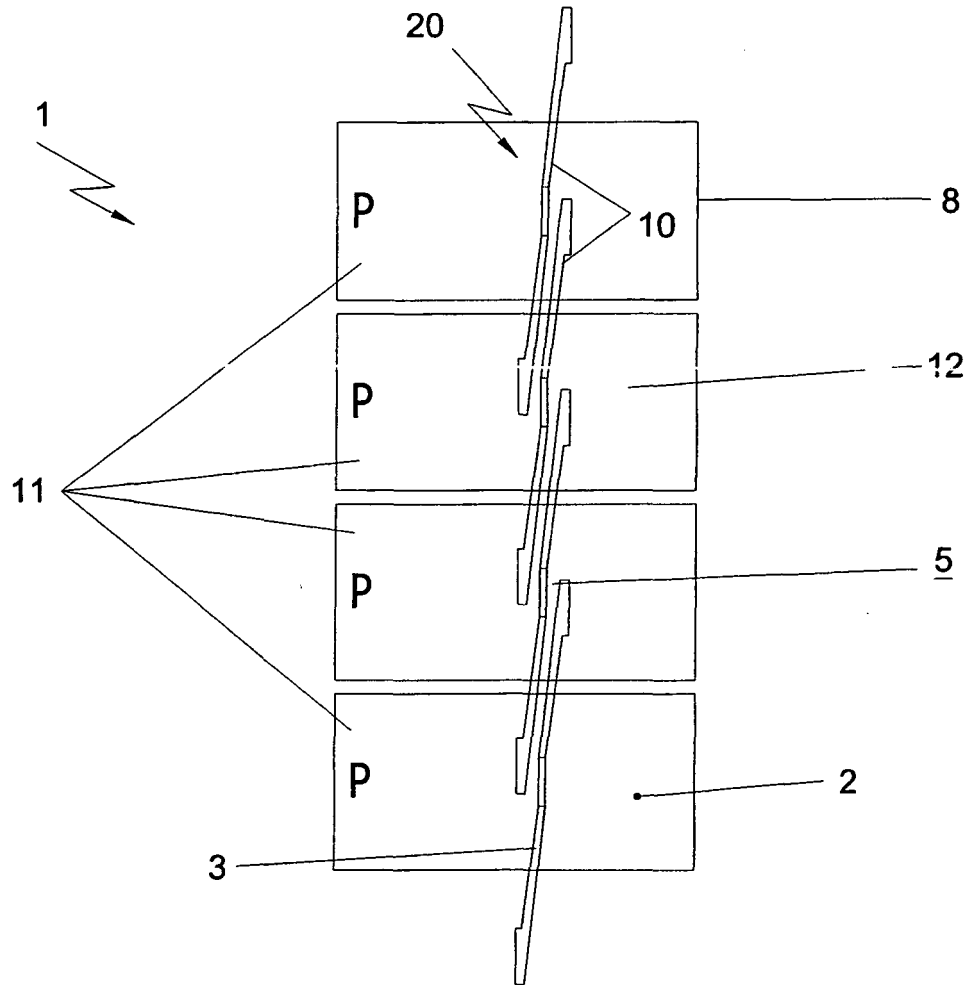


Fig.5G

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 20040011627 A [0003]